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Outbreak Summary 2002: Norovirus Takes Center Stage

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The main objective of any communicable disease outbreak investigation is to identify the infectious agent and the causative factors in order to control the outbreak and prevent further disease transmission. Thorough investigations can also monitor emerging trends and provide a knowledge base to prevent similar occurrences in the future. Therefore, outbreaks or clusters of unusual disease incidence are reportable to the Indiana State Department of Health (ISDH) [IAC 410 1-2.3]. Outbreak investigations should be a collaborative effort between the local health departments and ISDH. It is the local health department's responsibility to notify ISDH of the outbreak and to perform the majority of investigative procedures, while the role of the ISDH is mainly coordination and consultation. In large or complex outbreak situations, the ISDH may provide direct or on-site assistance.

This narrative describes only those outbreak investigations in which the ISDH Epidemiology Resource Center participated. The ERC investigated a total of 33 outbreaks in 2002 (Table 1), double the number of outbreaks investigated in 2001. This was due largely to the increased number of viral gastroenteritis outbreaks investigated (see below).

Of the reported outbreaks, one was respiratory and 31 were gastrointestinal. Of the gastrointestinal outbreaks, 14 were foodborne, 16 were spread by person-to-person contact, and one had no conclusive transmission route. No waterborne outbreaks were reported in 2002. The Food Protection Program and Long Term Care Program, in addition to lending valuable expertise and experience during outbreak investigations, also investigate a substantial number of food-related complaints and other clusters of illness for which the ERC never becomes involved.

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Respiratory

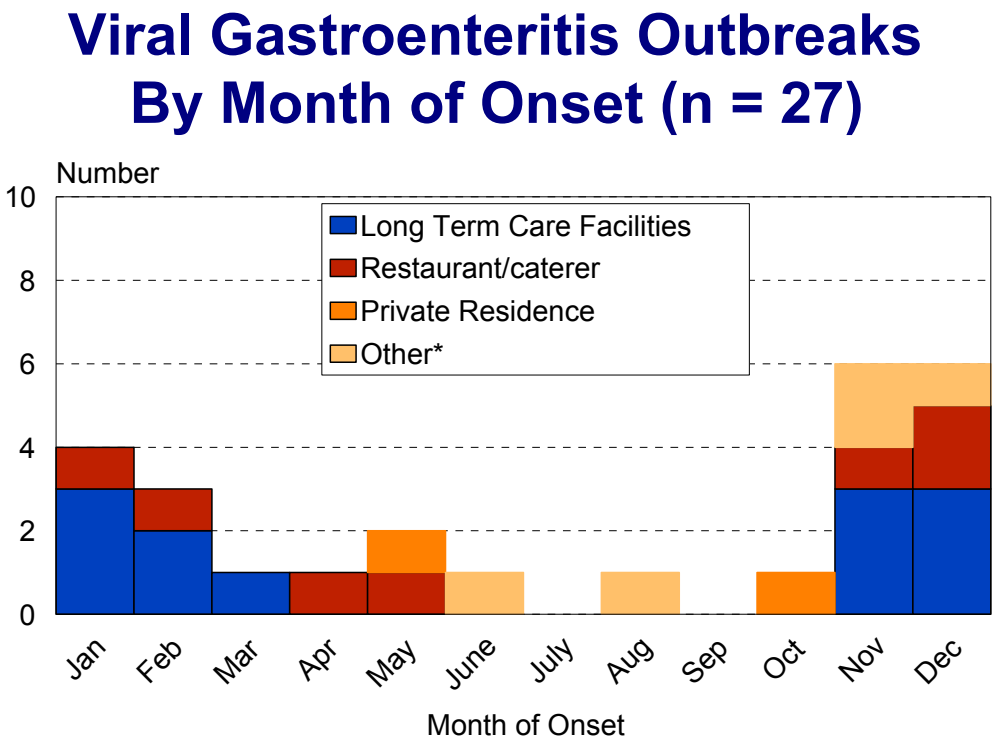
An outbreak of pertussis occurred during 2002 in LaGrange County among a poorly vaccinated population. A total of 52 cases were reported during the year, with the majority (46) having cough onset from July-November, with only two cases being reported in December. Thirty-six of the cases (69%) were in the 1-10 year age group, with another 9 cases (17%) under one year of age. Only two of the cases (4%) were 20 years or older and the 5 other cases (10%) were ages 11-19. Twenty-five of the cases that were between 1-10 years of age had not received any pertussis-containing vaccine. Thirty-two (61.5%) of the cases were female, 20 (38.5%) were male, and all were of the white race. Ten of the cases were confirmed by culture.

Gastrointestinal

Viral

In 2002, the genus name Norovirus was created to include Norwalk and Norwalk-like caliciviruses. More outbreaks investigated in 2002 were attributed to noroviruses than any other agent. Fifteen confirmed and 12 suspected outbreaks of norovirus occurred in Indiana, almost double the number of viral outbreaks investigated in 2001. Settings included long-term care facilities, restaurants/caterers, homes, retreat centers and hotels, and hospitals (see Figure 1). The setting could not be conclusively determined for one outbreak.

Figure 1.



*includes hospitals, hotels, retreat center, and workplace

Noroviruses are the most common causes of acute gastroenteritis in the U.S., and are easily transmitted by contaminated food and beverages. Foodborne viral outbreaks usually occur when an infected person handles raw foods (salads, vegetables, etc.) or ready-to-eat foods (sliced luncheon meats, rolls, etc.) without thoroughly washing hands after using the restroom. Due to the extremely infectious nature of viral agents, noroviruses can also easily be transmitted from person to person via contaminated hands or surfaces, and evidence suggests that these viruses may also be transmitted through inhalation of vomitus. Ten of the outbreaks were foodborne and sixteen were attributed to person-to-person contact. In most outbreaks, there was a background of illness among food handlers or contact with others ill prior to the outbreak. The inoculum dose is extremely low, and those infected can continue to shed virus in stool up to two weeks after symptoms cease. Symptoms include watery diarrhea, nausea and vomiting, generally within 24-48 hours after exposure.

The increase in the number of viral outbreaks was largely due to a novel strain of Norovirus that emerged in 2002. This strain was responsible for large outbreaks on cruise ships and in several other states, particularly in institutional settings. This strain was named the "Farmington Hills" strain after the area in Michigan where the first cases with the new strain were identified. Several of the norovirus outbreaks reported occurred in the late fall (see figure 1), the same time when an increase in norovirus outbreaks was reported from other states.

Bacterial Intoxications

In February, an outbreak occurred among coworkers who ate at a local restaurant. Four cases were identified, but specimens for laboratory testing were not available. According to the clinical information provided, if the outbreak was foodborne, illness was most likely an intoxication caused by *Staphylococcus aureus* or *Bacillus cereus*. Several food samples tested negative for *S. aureus* and *B. cereus*, and plate counts tested within normal limits. Alternatively, the outbreak may also have been related to a common exposure within the workplace and caused by a different agent.

Three outbreaks caused by *Clostridium perfringens* were confirmed in 2002. *Clostridium perfringens* is a bacterium found in soil and the gastrointestinal tract of healthy people and animals, including cattle, pigs, poultry and fish. The bacterial cells form spores that allow the organism to survive periods of environmental stress, such as temperature extremes and dryness. Illness occurs when food contaminated by soil or feces is held under conditions favorable for multiplication of the organism, and illness is usually associated with inadequately heated, cooled or reheated "dense" foods such as meats, stews and gravies. Once ingested, the organism replicates in the gastrointestinal tract and produces an enterotoxin that causes the characteristic symptoms. The illness is not transmissible person-to-person.

In April, 26 cases were identified at a county jail. Illnesses were confined to one area of the jail. Two cases tested positive. Although food samples from the statistically implicated meal tested negative for *C. perfringens*, a sample of chicken a la king had a high aerobic plate count, an indicator of possible mishandling or temperature abuse. Since meals were prepared in a central kitchen and transported to different cell blocks, slow cooling may have occurred during transport, allowing bacterial growth and subsequent toxin release into the food. Although the chicken a la king tested negative for *C. perfringens*, toxins and pathogens are often unequally distributed in food.

Forty-four cases were identified in an outbreak at a state correctional facility in November. Illnesses were confined to three areas of the facility. Two cases tested positive for *C. perfringens*, and food samples from the implicated meal had high aerobic plate counts and coliform counts, indicators of possible temperature abuse and improper hygiene. Since meals were prepared in a central kitchen and transported to different cell blocks, slow cooling may have occurred during transport, allowing bacterial growth and subsequent toxin release into the food. Food samples tested negative for *C. perfringens*; however, statistical analysis revealed refried beans as the most likely vehicle.

An outbreak associated with a catered dinner at a workplace also occurred in November. Twenty-nine cases were identified, and one tested positive for *C. perfringens*. Mashed potatoes from the dinner tested positive for *C. perfringens*, turkey and potatoes had high aerobic plate counts, and turkey, potatoes and stuffing had high coliform counts. Statistical analysis to identify a food vehicle could not be performed due to the limited number of controls, but the anecdotal evidence indicted that the turkey was the most likely vehicle. Although the turkey tested negative for *C. perfringens*, bacteria were most likely introduced to other food items through cross-contamination. The exact mechanism of bacterial proliferation was not identified, however, the process for thawing the turkey may have played a role.

Bacterial Infections

In February, an outbreak of *Shigella dysenteriae* was confirmed. *S. dysenteriae* is usually associated with developing countries but rare in the United States. Foodborne outbreaks of shigellosis usually occur when an infected person handles raw or ready-to-eat foods without thoroughly washing hands after using the restroom. Due to the extremely infectious nature of the bacteria, shigellosis can also easily be transmitted from person to person via contaminated hands or surfaces. The inoculum dose is extremely low (10-100 bacteria), and without proper antibiotic treatment, bacterial shedding can continue up to one month after symptoms cease.

Three cases were identified, all of whom ate at the same restaurant within two days of each other. All three tested positive for *Shigella dysenteriae* serotype 9. PFGE analysis indicated that two cases had identical band patterns, and one case differed by only one band, strongly indicating a common source. No common food item was identified. One employee reported traveling to an endemic country and returning to work the day one of the cases ate at the restaurant. This employee reported having gastrointestinal symptoms consistent with shigellosis during and after return from the trip and continued to work as scheduled. Although the employee did not directly prepare food, the employee did assist other staff members with serving food once it was prepared. The employee did not seek medical attention during illness. A follow-up stool specimen tested negative, however, this was collected several weeks after illness, and shedding had likely stopped. No other employees reported illness or overseas travel.

Outbreak Investigation

Based on experiences in disease investigation, the ISDH makes the following recommendations to local health departments for efficient and scientifically sound disease investigations:

- *Maintain supplies for outbreak investigations.* **Local health departments should have adequate supplies necessary for outbreak investigations.** Containers for collecting stool specimens specific for bacterial and viral pathogens (7A) should be readily available. Be sure to check the expiration dates on the containers. **New containers can be ordered or expired ones replaced by calling the ISDH Containers Section at (317) 233-8104. Call (317) 233-7740 for information regarding specimen collection for respiratory outbreaks.**

- *If an outbreak is suspected, contact the ISDH field epidemiologist in your district as soon as possible.* Gather basic information about the outbreak beforehand. For foodborne outbreaks, this information includes:

  - Type of event, location, date, number of meal(s) served and time of meal(s)
  - Source of food served (caterer, home, etc.) and contact person for the source
  - Number of exposed persons
  - Number of known ill persons
  - Range and times of illness onset
  - Main symptoms

- Contact person for ill persons and phone number, if possible
- Menu of all food and beverage items served
- Availability of clinical and food samples

For respiratory outbreaks, obtain the following information:

- Location of outbreak
- Number of known ill persons
- Range and times of illness onset
- Main symptoms
- Contact person for ill persons and phone number, if possible
- Any laboratory results already obtained by private physicians
- Availability of clinical samples (i.e., are people still becoming ill)

- *Ensure that everyone involved in the process is working together*. This may involve initial and even daily meetings among environmental and nursing staffs. Public health nurses and environmental health specialists each have a critical role to play in outbreak investigations.

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SUMMARY OF DISEASE OUTBREAKS INVESTIGATED BY THE ISDH EPIDEMIOLOGY RESOURCE CENTER INDIANA, 2002

Month	County	Site	Description	Organism[1]	Most probable source	Local Participation	Comments[2]
January	Johnson	Long-term care facility	Gastroenteritis 11 cases	Norovirus	Unknown	Johnson CHD	2 cases confirmed
January	Marion	Long-term care facility	Gastroenteritis 85 cases	Unknown	Community	Marion CHD	Probably viral
January	Vanderburgh	Restaurant	Gastroenteritis 21 cases	Unknown	Infected staff member	Vanderburgh CHD Posey CHD	Probably viral
January	Vanderburgh	Long-term Care facility	Gastroenteritis 72 cases	Norovirus	Community	Vanderburgh CHD	4 cases confirmed
February	Lake	Long-term care facility	Gastroenteritis 24 cases	Unknown	Community	Lake CHD	Probably viral
February	Bartholomew	Restaurant	Gastroenteritis 3 cases	*Shigella dysenteriae*	Infected staff member	Bartholomew CHD Brown CHD Jennings CHD	3 cases confirmed
February	Sullivan	Long-term care facility	Gastroenteritis 16 cases	Unknown	Community	Sullivan CHD	Probably viral
February	DeKalb	Restaurant or workplace	Gastroenteritis 4 cases	Unknown	Unknown	DeKalb CHD	Transmission route unknown
February	Monroe	Restaurant	Gastroenteritis 20	Norovirus	Infected staff member	Monroe CHD	1 case confirmed
March	Marion	Long-term Care facility	Gastroenteritis 18 cases	Norovirus	Community	Marion CHD	2 cases confirmed
April	Marion	Correctional facility	Gastroenteritis 26 cases	*Clostridium perfringens*	Chicken a la king	Marion CHD	2 cases confirmed
April	Ripley	Restaurant	Gastroenteritis 23 cases	Unknown	Infected staff member	Ripley CHD	Probably viral
May	Howard	Restaurant	Gastroenteritis 31 cases	Norovirus	Infected staff member	Howard CHD	1 case confirmed
May	Marion	Private residence	Gastroenteritis 9 cases	Norovirus	Infected family member	Marion CHD	1 case confirmed

Month	County	Site	Description	Organism[1]	Most probable source	Local Participation	Comments[2]
June	Clark	Retreat center	Gastroenteritis 20 cases	Unknown	Community	Clark CHD	Probably viral
July	LaGrange	Community	Respiratory infection 46 cases	***Bordetella pertussis***	Infected case	LaGrange CHD	10 cases confirmed
August	Orange	Hotel	Gastroenteritis 10 cases	Norovirus	Infected family member	Orange CHD	3 cases confirmed
October	Steuben	Private residence	Gastroenteritis 13 cases	Unknown	Unknown	Steuben CHD DeKalb CHD	Probably viral
November	LaPorte	Correctional facility	Gastroenteritis 44 cases	*Clostridium perfringens*	Refried beans	LaPorte CHD	2 confirmed cases
November	White	Factory	Gastroenteritis 29 cases	*Clostridium perfringens*	Turkey	White CHD	1 confirmed case
November	Marion	Hotel	Gastroenteritis 34 cases	Unknown	Unknown	Marion CHD	Probably viral
November	Vanderburgh	Restaurant	Gastroenteritis 10 cases	Norovirus	Infected staff member	Vanderburgh CHD	5 confirmed cases
November	Porter	Long-term care facility	Gastroenteritis 7 cases	Unknown	Community	Porter CHD	Probably viral
November	Vanderburgh	Long-term care facility	Gastroenteritis 46 cases	Norovirus	Community	Vanderburgh CHD	5 confirmed cases
November	Lake	Hospitals	Gastroenteritis 34 cases	Norovirus	Infected staff member	Lake CHD East Chicago CHD	5 confirmed cases
November	Vanderburgh	Long-term care facility	Gastroenteritis 23 cases	Norovirus	Community	Vanderburgh CHD	2 confirmed cases
December	Monroe	Long-term care facility	Gastroenteritis 48 cases	Norovirus	Community	Monroe CHD	1 confirmed case
December	Vanderburgh	Long-term care facility	Gastroenteritis 50 cases	Norovirus	Community	Vanderburgh CHD	7 confirmed cases
December	Marion	Restaurant	Gastroenteritis 8 cases	Unknown	Unknown	Marion CHD	Probably viral
December	Marion	Restaurant	Gastroenteritis 16 cases	Norovirus	Infected staff member	Marion CHD	1 confirmed case
December	Tippecanoe	Hospital	Gastroenteritis 27 cases	Norovirus	Infected staff member	Tippecanoe CHD	4 confirmed cases

Month	County	Site	Description	Organism[1]	Most probable source	Local Participation	Comments[2]
December	Lake	Long-term care facility	Gastroenteritis 43 cases	Unknown	Community	Lake CHD	Probably viral

1. **Organisms culture-confirmed from stool samples, foods, other environmental sources, or determined by serologic testing.**
2. **Assessment of likely etiology based on incubation period, distribution of cases, and spectrum of symptoms shown.**

Suicide In Indiana

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The newly established Injury Prevention Program at the Indiana State Department of Health (ISDH) presents the following excerpts from a newly released 24-page report on Suicide in Indiana, 1999-2001, based on the most recent mortality and morbidity data available.

Overview

Mortality due to suicide accounts for approximately 30,000 lives in the United States each year. More than 264,000 Americans are treated annually in U.S. hospital emergency departments after attempting to take their own lives. Still, many suicides or suicide attempts go unreported, making the magnitude of the problem far greater than what current statistics demonstrate. **Eighty-four people commit suicide each day in the United States**.

Prior to 1998, suicide ranked in the top ten leading causes of death in the U.S. Suicide now ranks as the 11th cause of death in both the U.S and in Indiana. There have been minimal changes in its ranking when considering specific age groups.

Suicide in the United States

Suicide is the eleventh leading cause of death for all Americans, the second leading cause of death for young adults age 25-34 years, and the third leading cause of death for those 10-24 years of age. In 2000, suicide accounted for 29,350 deaths, a rate of 10.7 per 100,000-population (1). Mortality due to suicide is generally higher than the national average in the western states and lower in the eastern and mid-western states (2). Suicide rates increase with

HIGHLIGHTS:

- In 2001, 706 Hoosiers committed suicide. Suicide ranked as one of the five leading causes of death for all persons age 15-54. For Hoosiers age 10-24, suicide ranked as the 3rd leading cause of death and accounted for 13% of all injury deaths in this age group.
- From 1999-2000, suicide was the 2nd leading cause of INJURY deaths in Indiana, accounting for 20% of all injuries.
- Compared to the national average, suicide rates in Indiana are higher for all age groups, except for senior citizens.
- Hoosiers age 10-24 commit suicide more often when compared to 10-24 year olds in the United States and all regions in the U.S.
- During the period 1999-2000, male Hoosiers had suicide rates 4-6 times those of females.
- Black male Hoosiers age 20-24 have a higher rate of suicide compared to all other age groups.
- Suicide rates are considerably lower for female Hoosiers. From 1999-2000, females age 40-49 committed suicide at a rate of 8.13 per 100,000 population, the highest rates for females regardless of age.
- The use of firearms accounted for 60% of all suicides in Indiana.
- According to the 2001 Youth Risk Behavioral Survey results for Indiana's 9th through 12 graders, 22.6% of females and 13.3% of males seriously considered attempting suicide during the past twelve months; 18.6% of females and 13.5% of males had a plan and 11.2% of females and 5.2% of males actually attempted suicide one or more times.
- From January 2002 to June 2002, 913 Hoosiers age 12-91 were hospitalized as a result of self-inflicted injuries specified as intentional, (i. e., attempting to commit suicide). Eighty-four percent of these hospital admissions involved white males and females.
- Ninety-two percent of people hospitalized for a suicide attempt in the first 6 months of 2002 involved self-inflicted poisoning by solid or liquid substances. The most frequent poisoning diagnoses requiring hospitalization resulted from ingestion of tranquilizers (34%) followed by the category of analgesics, antipyretics, and antirheumatics (23%).

age and are highest among Americans 65 years and older, especially those who are divorced or widowed. The Centers for Disease Control and Prevention (CDC) reports that **on average, an older adult commits suicide every 90 minutes in the United States**. Men in this age group have the highest rate. Risk factors associated with this higher incidence of suicide include but are not limited to depression, mental illness, and chronic disease. It is believed that men are less likely to ask for help, especially help for emotional concerns. This factor may contribute to the increased risk of suicide death in this category. In nearly all cases, men 65 and older who commit suicide suffer from depression and become more socially isolated and vulnerable to suicide (3).

Males are four times more likely to die from suicide than females, however females are more likely to attempt suicide than males. White males and white females are known to attempt suicide at higher rates than other races; together they accounted for over 90% of all suicides in 1999 (2). Males attempting suicide are also more likely to use lethal means, such as guns, which makes them at least four times more likely than females to die from suicide (3).

Nearly 3 of every 5 suicides were committed with a firearm. From 1999-2000, there were a total of 92,960 violence-related injury deaths. Over a third of these (39.4%) resulted from males who committed suicide with the use of a firearm – the number one mechanism regardless of age. In addition, suicide deaths by firearm were the leading cause of violence related injury deaths for males 35 years of age and older, the second leading cause for males 15-34 and the third leading cause for males 10-14 (1).

Persons under age 25 accounted for 14% of all suicides. Teens and young adults are involved in violence more often than any other age group. At this developmental stage, they may act impulsively and frequently engage in risk-taking behavior. Peer pressure in this group also increases the likelihood for involvement with substance abuse, delinquent peers and attempting personal violence, contributing factors for suicide and suicidal behavior in this age group. (3) **In 1999, more teenagers and young adults died from suicide than from cancer, heart disease, AIDS, birth defects, stroke, and chronic lung disease combined** (2).

Suicide in Indiana

From 1999-2000, 6,689 Hoosiers died from injuries, **an average of nine people each day**. While 67% of the injury deaths were unintentional (accidental), 20% of these deaths resulted from suicide and 11% from homicide (Figure 1). Results from the 2001 Adolescent and School Health report ranked suicide as the third leading cause of death for Hoosiers ages 10-24 years, accounting for 13% of all deaths in Indiana.

When reviewing suicide deaths among Hoosiers by race, gender and age, there are more suicide deaths among white males in all categories (Figure 2). However, **black male Hoosiers, age 20-24 have a higher rate of suicide when compared to all other age groups (Figure 3).**

According to the 2001 Indiana Mortality Report, suicide ranked as one of the five leading causes of death for the Hoosiers age 15-54. During this same period, mortality due to suicide took the lives of 706 Hoosiers at a rate of 11.66 per 100,000 population. Males accounted for 80% (565) of all suicides, of which 94% (533) were white men. Overall, females committed suicide less often than males, and white females, who represented 20% (141) of all suicides, did so more often than black females.

Data On Suicide In Indiana

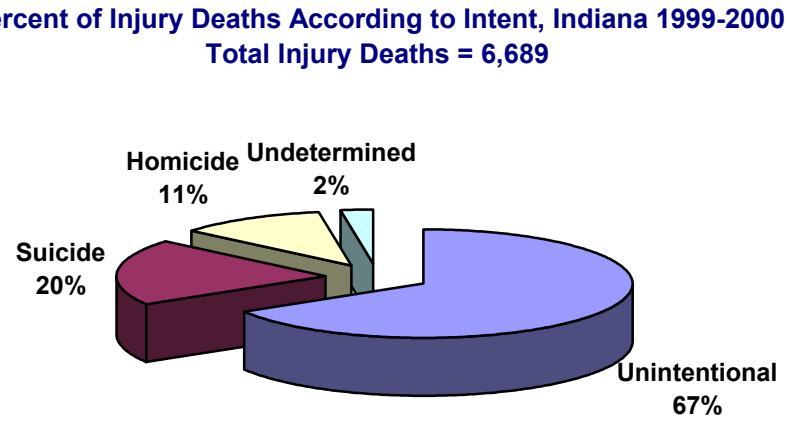
Table 1: Comparison of Suicide Rates During 1999-2000

Age in years	Indiana		United States		Northeast		South		West		Midwest	
	Deaths	Crude Rate	Deaths	Crude Rate	Deaths	Crude Rate	Deaths	Crude Rate	Deaths	Crude Rate	Deaths	Crude Rate
10-24	215	8.4	8,437	7.3	1,121	5.54	3,155	7.68	2,068	7.68	2,093	7.66
25-64	882	14.2	39,285	13.77	5,819	10.55	15,231	15.06	9,703	15.25	8,532	13.03
65+	214	14.39	10,818	15.61	1,452	9.9	4,225	17.34	2,908	20.97	2,233	13.61

Rates are per 100,000 population.
(Source: CDC, WISQUARS)

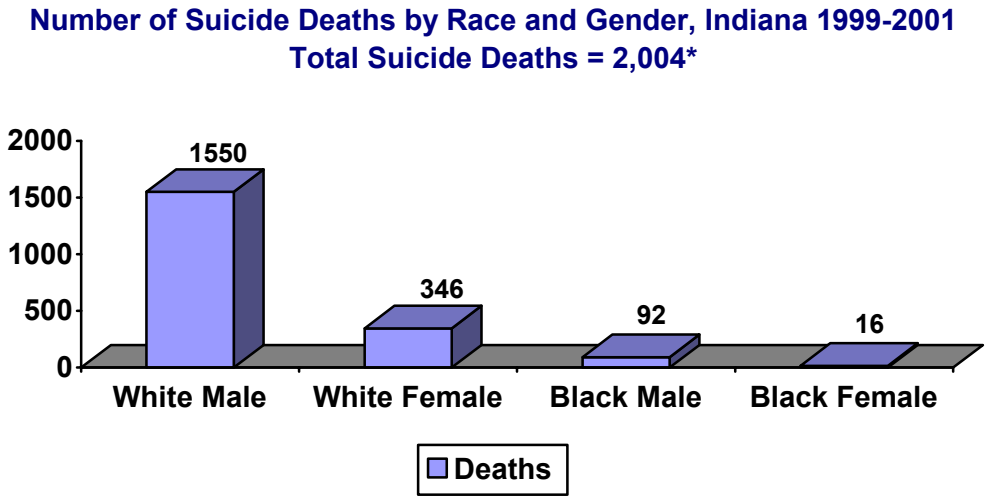
Compared to the national average, suicide rates in Indiana are higher for all age groups, except for senior citizens. Hoosiers ages 10-24 years commit suicide more often when compared to the same age group nationwide. (Table 1).

Figure 1: Suicide as the second leading cause of injury death among Hoosiers.



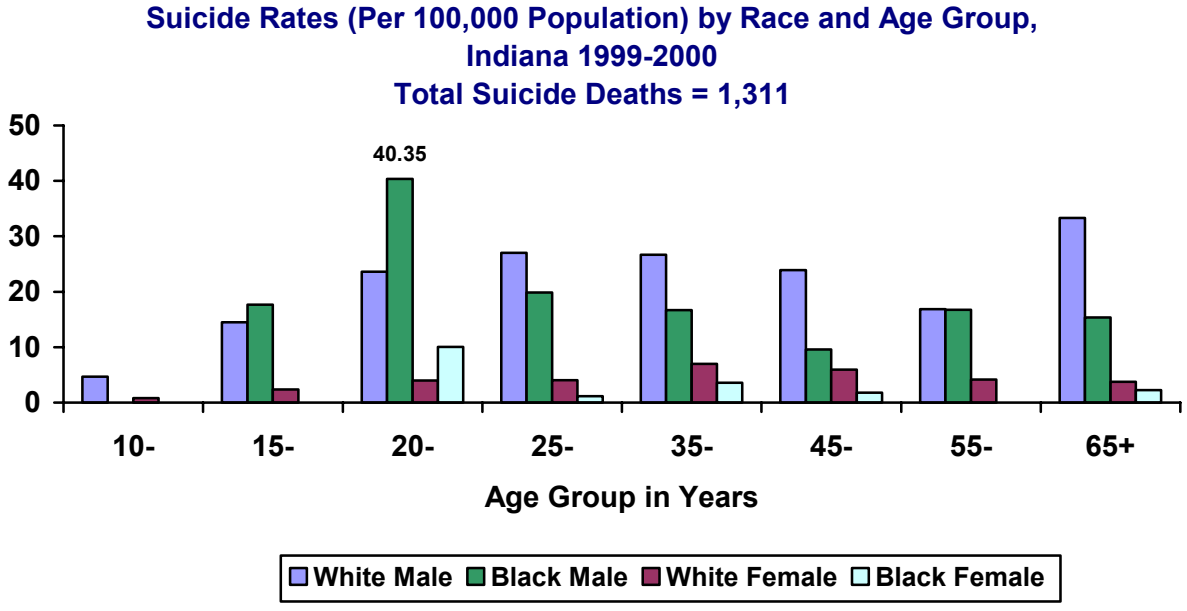
(Source: CDC, WISQARS)

Figure 2: Suicide deaths: 16.8 ratio of White males to Black males



(Source: CDC, WISQUARS and 2001 Indiana Mortality Report)
*Data include number of deaths from 1999-2000 (WISQARS) and the 2001 Indiana Mortality Report.

Figure 3: Higher rate of suicides among Black males age 20-24 years



(Source: CDC, WISQARS)

Youth Risk Behavior Surveillance System Data

The Youth Risk Behavior Surveillance System (YRBSS), established by the CDC, monitors the prevalence of youth behaviors impacting health. Its focus is on risky behaviors that would have an adverse effect both physically and socially among youths and young adults. The result of the 2001 national school-based Youth Risk Behavior Survey for Indiana (unweighted data) indicates that 18.4% of 9th through 12th grade Hoosiers (22.6% of males, 13.3% of females) seriously considered attempting suicide during the past twelve months. Sixteen percent (13.5% of males, 18.6% of females) of the students had a plan for how they would attempt suicide, and 8.6% (5.2% of males, 11.2% of females) of the students actually attempted suicide one or more times during the past twelve months. Because data presented in the YRBSS report for the United States is weighted, comparisons cannot be made with Indiana.

Hospital Discharge Data On Suicide Attempts

The first two quarters of the Indiana 2002 hospital discharge dataset totaled 361,823 records. Of these, 14,902 had a principle diagnosis for injury and poisoning (ICD-9-CM codes 800-999). Six-percent (913) represented patients with self-inflicted injuries specified as intentional. The average age was 35 (range: 12 to 91). Eighty-four percent of the attempts were made by persons of the white race, involving 60% females and 40% males. The majority (227 or 25%) of the injuries were among white females age 25-44 years.

Prevention Strategies

This report demonstrates that suicide is a problem at both the local and national level. Prevention strategies can be developed when populations at risk are identified. We see in this report that male Hoosiers are the primary victims of suicide, while females may suffer suicide-related injuries as a result of their attempts.

- In 1999, the Surgeon General's Call to Action to Prevent Suicide outlined suicide prevention strategies grouped under the "umbrella" term **AIM (Awareness, Intervention and Methodology).**
- **Awareness** seeks to appropriately broaden the public's awareness of suicide and its risk factors.
- **Intervention** refers to the enhancement of necessary services and programs.
- **Methodology** refers to advancing the science of suicide prevention. Suicide has been identified as a major public health issue and the Surgeon General has called for a public health approach to address it.

There are a number of tools that can be used to assess depression and the potential for suicide, such as questionnaires that are readily available to mental health professionals, counselors and health care providers. The availability of crisis intervention services, hotlines, and easy access to mental health providers can impact the problem of suicide in Indiana. All communities should become aware of what can be accomplished to prevent suicide in their locale.

For information on the Indiana Suicide Prevention Coalition, please contact one of the Co-Chairs, Kathleen O'Connell (oconnell@ipfw.edu) or Charlene Graves (cgraves@isdh.state.in.us). For information on the Injury Prevention Program at the Indiana State Department of Health, please contact Dr. Charlene Graves, Principle Investigator for the Core Injury Surveillance and Program Development Cooperative Agreement (#U17/CCU522371) funded by the National Center for Injury Prevention and Control (NCIPC) at the Centers for Disease Control and Prevention (CDC).

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Cylindrospermopsis raciborskii: Another harmful exotic invader?

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Cyanobacteria or blue-green algae possess characteristics of both bacteria and algae. Think of them as bacteria with photosynthetic properties. Cyanobacteria occur naturally in fresh and salt waters worldwide. Under conditions of excessive nutrient availability (primarily phosphorus), slow moving or stagnant water, and warmth, cyanobacteria may proliferate, producing surface scums, bottom mats, off-flavors, and, as they decompose, severe oxygen depletion. These "blooms" also have the potential to produce toxins that are harmful to humans and other animals. About 50 of the approximately 1500 species of cyanobacteria are thought to be capable of producing toxins, although even for these species the specific environmental conditions that lead to toxin production are often unknown.

Reported adverse health effects from cyanobacterial toxins include damage to the liver, nervous system, kidneys, gastrointestinal tract, respiratory tract, and skin. Human exposures described in the literature have occurred primarily through the intentional or unintentional ingestion of untreated water. Additional exposures have occurred through inhalation of water aerosols while swimming and through dermal contact. In 1996 in Brazil, more than 50 persons died when water containing a cyanobacterial toxin was used in their kidney dialysis machines. Animals drinking water containing toxins are also at risk of illness and death.

In August 2001, a contractor working for the Indiana Department of Natural Resources identified the cyanobacterium, *Cylindrospermopsis raciborskii*, in Ball Lake in Steuben County. This organism was thought to be primarily a tropical and sub-tropical species occurring in the United States only in the southeastern states. Because *Cylindrospermopsis* was known to be able to produce toxins, the Steuben County Health Department issued a health advisory against recreational use of Ball Lake until the water could be tested for the presence of toxins. Fortunately, only trace amounts of toxin were present at the time of sampling, and the health advisory was lifted. There were no reports of human or animal adverse health effects.

As a result of routine sampling in 2002, water company personnel found *Cylindrospermopsis* organisms in some of the reservoirs supplying water to the Indianapolis metropolitan area. Although organisms were present in untreated water away from intakes, none were found in samples collected at the intakes. Again, there were no reports of human or animal adverse health effects.

What are some of the public health implications of *Cylindrospermopsis* for Indiana?

- *Cylindrospermopsis* will probably be found in Indiana lakes from now on. Detection will depend on environmental conditions, season, and which lakes are sampled. *Cylindrospermopsis* tends not to form scums but rather dense bands below the surface.
- *Cylindrospermopsis* organisms can be identified by microscopic examination of water. Identification of the toxin requires concentration of water samples with subsequent animal inoculation or mass-spectrometry. Only a few laboratories in the country are able to measure toxin, and the cost per sample is high.
- The presence of other, non-toxic algal blooms will create public anxiety about health risks. Many of these blooms are unsightly and odorous. It will be important to be able to distinguish *Cylindrospermopsis* (and other potentially toxic) blooms from the merely esthetically unpleasant ones.
- The presence of *Cylindrospermopsis* will require evaluation by public health agencies. Response will depend on the concentration of organisms, the presence of toxin, and potential for human exposure. At present, there are no funds specifically ear-marked for toxin testing.
- The lack of official standards for safe levels of *Cylindrospermopsis* toxin complicates the public health response. The specific environmental conditions, which lead to toxin production, are not well characterized. Thus the mere presence of organisms does not necessarily mean that toxin is present in significant amounts. Chemicals, such as copper sulfate, which destroy algal cells, can actually cause an immediate increase in free toxin.
- Treatment of lake water for human consumption can greatly reduce the toxin levels. Thus, the greatest public health concern is from recreational use of contaminated waters. Eating fish from affected lakes is safe because the toxin does not appear to bioaccumulate in fish.
- It is not known how *Cylindrospermopsis* was transported to Indiana waters. Some possible routes include mechanical transfer via the surfaces of boats or waterfowl, emptying live bait waters from endemic areas into Indiana lakes, and wind carriage.
- Since there are no established standards and no apparent adverse health effects in Indiana, there are no plans to conduct *Cylindrospermopsis* surveillance for public health purposes.
- Algal blooms of all types can be reduced by limiting the amount of nutrients entering Indiana lakes. Common sources of nutrients include agricultural sources (animal wastes and fertilizers), lawn fertilizers, and failed septic systems.
- Although human and animal adverse health effects attributable to *Cylindrospermopsis* have been described in other locations, no such events have been reported in Indiana. At this time, the likelihood of injury due to exposure to affected waters is unknown but certainly a possibility.

Bottom line? *Cylindrospermopsis* health concerns will be with us for the foreseeable future. Despite the lack of clear standards for hazardous levels of organisms or toxin, future reports of *Cylindrospermopsis* in Indiana waters will necessitate a public health response. ISDH will work with local health departments and other agencies in crafting an appropriate response for each specific situation.

Training Room

Epidemiology and Prevention of Vaccine-Preventable Diseases

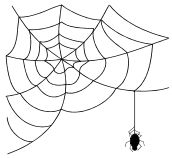
This on-site course is designed to provide updates on schedules, contraindications, standard immunization practices, vaccine-preventable diseases, and vaccine management and safety. Continuing education credit will be offered for a variety of professions based on 15 hours of instruction. No partial credit will be given.

When:	September 9-10, 2003
Time:	8:00 am to 5:00 pm
Where:	Adam's Mark Hotel, 120 W. Market Street, Downtown Indianapolis
Cost:	$75.00 for 2-day session (breakfast, lunch, & breaks provided)
Registration:	Thru smeechhinh@iupui.edu

Indiana University

Indiana State Department of Health
"Working for Hoosier Health - a Lifetime Investment"

MAPHTC
Mid-America Public Health Training Center



Wonderful Wide Web Sites

ISDH Data Reports Available

The ISDH Epidemiology Resource Center has the following data reports and the Indiana Epidemiology Newsletter available on the ISDH Web Page:

http://www.in.gov/isdh/dataandstats/epidem/epinews_index.htm

Indiana Cancer Incidence Report (1990, 95,96, 97)

Indiana Cancer Mortality Report (1990-94, 1992-96)

Indiana Health Behavior Risk Factors (1995-96, 97, 98, 99, 2000, 2001)

Indiana Hospital Consumer Guide (1996)

Public, Hospital Discharge Data (1999, 2000, 2001)

Indiana Maternal & Child Health Outcomes & Performance Measures (1988-97, 1989-98, 1990-99, 1991-2000)

Indiana Marriage Report (1995, 97, 98, 99, 2000)

Indiana Mortality Report (1999, 2000, 2001)

Indiana Natality Report (1998, 99, 2000, 2001)

Indiana Induced Termination of Pregnancy Report (1998, 99, 2000)

Indiana Infectious Diseases Report (2000)

Former Indiana Report of Diseases of Public Health Interest (1996, 97, 98, 99)

HIV Disease Summary

Information as of June 30, 2003 (based on 2000 population of 6,080,485)

HIV - without AIDS to date:

361	New HIV cases from July 2002 thru June 2003	12-month incidence	5.94 cases/100,000
3,732	Total HIV-positive, alive and without AIDS on June 30, 2003	Point prevalence	61.38 cases/100,000

AIDS cases to date:

453	New AIDS cases from July 2002 thru June 2003	12-month incidence	7.45 cases/100,000
3,412	Total AIDS cases, alive on June 30, 2003	Point prevalence	56.12 cases/100,000
7,179	Total AIDS cases, cumulative (alive and dead)		

REPORTED CASES of selected notifiable diseases

Disease	Cases Reported in June *MMWR* Week 23-26		Cumulative Cases Reported January - June *MMWR* Weeks 1-26	
	2002	2003	2002	2003
Campylobacteriosis	62	45	184	146
Chlamydia	1,308	1,192	8,296	8,204
E. coli O157:H7	5	10	20	26
Hepatitis A	7	8	30	27
Hepatitis B	9	3	18	13
Invasive Drug Resistant *S. pneumoniae* (DRSP)	4	3	104	86
Gonorrhea	567	457	3,566	3,136
Legionellosis	1	2	5	8
Lyme Disease	4	1	6	5
Measles	0	0	0	0
Meningococcal, invasive	2	8	22	28
Pertussis	4	3	22	28
Rocky Mountain Spotted Fever	0	0	0	0
Salmonellosis	36	52	185	240
Shigellosis	6	15	37	65
Syphilis (Primary and Secondary)	8	6	33	24
Tuberculosis	9	14	55	65
Animal Rabies	2 (bats)	0	7 (6 bats, 1 skunk)	2 (bats)

For information on reporting of communicable diseases in Indiana, call the *ISDH Epidemiology Resource Center* at (317) 233-7665.

Indiana
Epidemiology
Newsletter

The *Indiana Epidemiology Newsletter* is published by the Indiana State Department of Health to provide epidemiologic information to Indiana health professionals and to the public health community.